Translation of Pertinent Portions of JP-07-131780 A

[0002]

[Prior Art] Fig.9 shows a diagram for explaining an example of a remote control method of the prior art, which is a method of controlling a direction of a camera of a monitored side, i.e., a controlled side by a remote monitoring using ISDN.

[0003] In Fig.1, a reference numeral 1 denotes a monitor for monitoring image information of a remote side, a reference numeral 2 denotes a D/A conversion unit, a reference numeral 3 denotes a format inverse conversion unit, a reference numeral 4 denotes an image decoding unit, a reference numeral 5 denotes a multiplex and demultiplex unit, a reference numeral denotes an ISDN interface unit, a reference numeral 7 denotes an operation unit, a reference numeral 8 denotes a control unit, a reference numeral 9 denotes a camera, a reference numeral 15 denotes a tripod, a reference numeral 10 denotes an A/D conversion unit, a reference numeral 11 denotes a format conversion unit, a reference numeral 12 denotes an image encoding unit, a reference numeral 13 denotes a multiplex and demultiplex unit, a reference numeral 14 an ISDN interface unit, a reference numeral 16 denotes a control unit, and a reference numeral 30 denotes an ISDN network.

[0004] In addition, as shown in Fig.9, a control side is comprised of the monitor 1 for monitoring the image information of the remote side, the D/A conversion unit 2, the format inverse conversion unit 3, the image decoding unit 4, the multiplex and demultiplex unit 5, the ISDN interface unit 6, the operation unit 7, the control unit 8, and a controlled side is comprised of the camera 9, the tripod 15, the A/D conversion unit 10, the format conversion unit 11, the image encoding unit 12, the

multiplex and demultiplex unit 13, the ISDN interface unit 14, and the control unit 16.

[0005] In Fig.5, the control side is arranged so that the ISDN interface unit 6 receives image information from the controlled side through the ISDN network, the multiplex and demultiplex unit 5 separates the image information, and the image decoding unit 4 then decodes the image information to provide a digital image signal.

[0006] The above-described digital image information is subjected to format conversion by the format inverse conversion unit 3 to convert the digital image information into an image signal which can be displayed on the monitor 1, and then is converted into an analog image signal by the D/A conversion unit 2 to be displayed on the monitor 1.

[0007] Further, in order to control the remote camera 9, the operation unit 7 is operated to designate an operation direction and the like of the remote camera while monitoring the monitor 1.

[0008] This control information is transmitted to the controlled side by the control unit 8 via the multiplex and demultiplex unit 5. On the control side, the image information transmitted from the controlled camera 9 is monitored by the monitor 1 to designate a stop position by the operation unit 7, and this control information is transmitted to the controlled side through the control unit 8 and the multiplex and demultiplex unit 5.

[0009] On the controlled side, an image signal input form the camera 9 is converted into a digital image signal by the A/D conversion unit 10 and then converted into an image signal by the format conversion unit 11 to be encoded. The image encoding unit 12 then encodes the converted image signal.

[0010] Subsequently, the encoded image signal is multiplexed by the multiplex and demultiplex unit 13 to be transmitted to the control side, i.e., the monitoring side through the ISDN interface unit 14 and the ISDN network 30.

[0011] The control signal for the direction of the camera 9 or the like from the control side is demultiplexed by the multiplex and demultiplex unit 13 to be transmitted to the control unit 16.

[0012] The control unit 16 controls the tripod 15 which can change the direction of the camera, in accordance with the received camera control information to attain the camera operation designated by the control side.

[0034] [Embodiment 1] Fig.1 shows a diagram for explaining a remote control method of a first embodiment of the present invention, which controls a direction of a camera of a controlled side, i.e., a monitored side to remotely monitor an image using ISDN.

[0035] In Fig.1, a reference numeral 1 denotes a monitor for monitoring image information of a remote side, a reference numeral 2 denotes a D/A conversion unit, a reference numeral 3 denotes a format inverse conversion unit, a reference numeral 4 denotes an image decoding unit, a reference numeral 5 denotes a multiplex and demultiplex unit, a reference numeral 6 denotes an ISDN interface unit, a reference numeral 7 denotes an operation unit, a reference numeral 17 denotes a control unit, a reference numeral 9 denotes a camera, a reference numeral 18 denotes a tripod, a reference numeral 10 denotes an A/D conversion unit, a reference numeral 11 denotes a format conversion unit, a reference numeral 12 denotes an image encoding unit, a reference numeral 13 denotes a multiplex and demultiplex unit, a reference numeral 14 denotes an ISDN interface unit, a reference numeral 19 denotes a control unit, and a reference numeral 30 denotes an ISDN network.

[0036] The element denoted, in Fig.1, by the same reference numeral as that in Fig.9 operates in the same manner as that in Fig.9. The explanation thereof is therefore omitted.

[0037] The tripod 18 of a controlled side outputs, to the control unit 19, position information for a current control operation as a control parameter.

[0038] The control unit 19 controls the tripod 18 and also effects control so that the multiplex and demultiplex unit 13 multiplexes the control parameter input from the tripod 18 and image information to transmit the multiplexed information to a control side.

[0039] On the control side, the received information is demultiplexed into the image information and the control parameter by the multiplex and demultieplex unit 5 to transmit the control parameter to the control unit 17.

[0040] When the operation unit 7 designates stop of the camera, the control unit 17 transmits the control parameter received by that time, together with a control command indicating the stop of the camera.

[0041] When the controlled side receives the control command indicating the stop of the camera 9 from the control side, the tripod 18 of the camera 9 is operated in accordance with the control parameter received at the same time to be operated to a position designated by the received control parameter, and then the camera 9 is stopped.

[0085] [Embodiment 6] Fig.8 shows a diagram for explaining a remote control method of a sixth embodiment of the present invention, which controls quality of image information transmitted from a controlled side, i.e., a

monitored side to a control side to remotely monitor an image using ISDN.

[0086] In Fig.8, a reference numeral 1 denotes a monitor for monitoring image information of a remote side, a reference numeral 2 denotes a D/A conversion unit, a reference numeral 3 denotes a format inverse conversion unit, a reference numeral 4 denotes an image decoding unit, a reference numeral 5 denotes a multiplex and demultiplex unit, a reference numeral 6 denotes an ISDN interface unit, a reference numeral 7 denotes an operation unit, a reference numeral 17 denotes a control unit, a reference numeral 9 denotes a camera, a reference numeral 10 denotes an A/D conversion unit, a reference numeral 11 denotes a format conversion unit, a reference numeral 25 denotes an image encoding unit, a reference numeral 13 denotes a multiplex and demultiplex unit, a reference numeral 14 denotes an ISDN interface unit, a reference numeral 26 denotes a control unit, and a reference numeral 30 denotes an ISDN network.

[0087] The element denoted, in Fig.8, by the same reference numeral as that in Fig.1 operates in the same manner as that in Fig.1. The explanation thereof is therefore omitted.

[0088] Generally, a basic interface ISDN line and the like can attain a transmission rate such as 64 kbps or 128 kbps, while they require data compression of a compression rate such as 1/1000 to transmit image information.

[0089] As a data compression method there has been provided a spatial data reduction method which deteriorates quality of each frame, and a temporal data reduction method which thins out frames. It is preferable in some cases to change an encoding method in accordance with use conditions of a camera and contents of an image signal to be encoded. For example, in case that a remote camera and the like are

controlled, it can attain improved operationality to mainly use the spatial data reduction method during movement of the camera and mainly use the temporal data reduction method after completion of the movement of the camera.

[0090] In the sixth embodiment, the image encoding unit 25 which can change quality of image information, is employed to control quality of image information to be transmitted to a control side.

[0091] The image encoding unit 25 is controlled by the control unit 26, while the control unit 26 receives control parameter indicating an image information quality control state of the image encoding unit 25, and transmits the received control parameter to the control side.

[0092] Thus, the present embodiment also can attain, similarly to each embodiment described above, that the control side controls image information quality of the image encoding unit 25 of the controlled side by using the received control parameter, thereby attaining desired image information quality of the image encoding unit 25.